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EXAMINER	
KROFCHECK, MICHAEL C	
ART UNIT	**PAPER NUMBER**
2186	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/748,407	CHONG ET AL.	
	Examiner	Art Unit	
	Michael Krofcheck	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed on 11/28/2006.

2. Claims 1, 8-15, 22, and 27-30 have been amended.

3. The objections/rejections from the prior correspondence not restated herein have been withdrawn.

Terminal Disclaimer

4. The terminal disclaimer filed on 11/28/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of patent 7,111,137 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 8-14, 27-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

7. Claims 8-14, 27-30 are not limited to physical articles or objects and fails to be structurally and functionally interconnected with the software in such a manner to enable any usefulness to be realized. In view of the applicant's disclosure, specification pages 9-10, paragraph 0041, the medium is not limited to physical articles, instead

being defined as including both tangible embodiments (e.g., ROM and RAM) and intangible embodiments (e.g., electrical, optical, acoustical, or other forms of propagated signals, carrier waves, infrared signals, digital signals, etc.). As such, the claim is not limited to statutory subject matter and is therefore non-statutory.

The examiner suggests re-wording paragraph 0041 comparable to the following:

> A machine-readable medium includes any mechanism for storing information in a form readable by a machine (e.g., a computer). For example a machine-readable medium includes read only memory; random access memory; magnetic disk storage media; optical storage media; and flash memory devices. Transmission media includes any mechanism for transmitting information in a form readable by a machine. For example, transmission media includes electrical, optical, acoustical, or other forms of propagated signals (e.g., carrier waves, infrared signals, digital signals, etc. which would provide the computer program instructions).

And amending claim 8, to read, "a *machine-readable medium* having computer readable instructions embodied therein to cause a computer to perform operations comprising...".

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-3, 8-10, 15-17, 22 rejected under 35 U.S.C. 102(e) as being anticipated by Kawamura et al., US patent application publication 2004/0236915.

10. With respect to claims 1, 8, and 22 Kawamura teaches of a method for preserving data in a data storage system, the method comprising: receiving a command to preserve data in the data storage system (fig. 5; item 501; paragraph 0029);

executing a first input and output (I/O) process in the data storage system existing at a selected time relative to the command (fig. 5; item 502; paragraph 0029, 0031; data write request Wa); and

executing a second I/O process in the data storage system which begins after the selected time (fig. 5; item 502; paragraph 0029, 0032; data write request Wb),

the second I/O process executing while the first I/O process is executing (fig. 5; paragraph 0009; 0032-0033),

wherein the second I/O process is accessing the same data, in the data processing system, as the first I/O process (paragraph 0029; since both data write requests are in response to a single data write to the primary storage, they must be writing the same data since there is only one "data" involved).

As this is carried out by a computer and storage devices, there must be a memory storing code that is executed on a processor to perform the above steps.

11. With respect to claim 15 Kawamura teaches of an apparatus for preserving data in a data storage system, comprising: means for receiving a command to preserve data in the data storage system (fig. 1, 2; paragraph 0022-0023, 0029; operating system running on the components of the host computer);

means for executing a first input and output (I/O) process in the data storage system existing at a selected time relative to the command (fig. 1-3; paragraph 0029, 0031; items 10, 20); and

means for executing a second I/O process in the data storage system which begins after the selected time, the second I/O process executing while the first I/O process is executing, wherein the second I/O process is accessing the same data, in the data processing system, as the first I/O process (fig. 1-2, 4; paragraph 0029, 0032; items 10, 30; since both data write requests are in response to a single data write to the primary storage, they must be writing the same data since there is only one "data" involved).

12. With respect to claim 2, 9, and 16, Kawamura teaches of wherein the selected time is when the command is received and the first I/O process is being executed at the selected time (fig. 5; paragraph 0029).

13. With respect to claim 3, 10, 17, Kawamura teaches of wherein the first I/O process is being executed on a first storage volume and the second I/O process is being executed on a second storage volume (fig. 1, 5; paragraph 0029).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claims 4-6, 11-13, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura and Boone et al., US patent 6453396.

18. With respect to claims 4 and 11, Kawamura fails to explicitly teach of acquiring a lock from a lock mechanism to protect a storage location being replicated. However, Boone teaches of acquiring a lock from a lock mechanism to protect a storage location being replicated, the lock mechanism being maintained independent of a first and second storage volumes (fig. 4; column 3, line 35-60; column 8, lines 32-56; In the combination of Kawamura and Boone, the data originates in the host computer, it is

abundantly clear to one of ordinary skill in the art that the host computer would control the locking within itself. Thus locking mechanism of the host computer is independent of the storage volumes).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura and Boone at the time of the invention to lock the data of Kawamura being copied as taught in Boone. Their motivation would have been to solve data access conflicts that could result in an inconsistency in data (Boone, column 3, lines 64-66).

19. With respect to claim 18, Boone teaches of means for acquiring a lock from a lock mechanism to protect a storage location being replicated, the lock mechanism being maintained independent of a first and second storage volumes (fig. 4; column 3, line 35-60; column 8, lines 32-56; host computer).

20. With respect to claims 5 and 12, the combination of Kawamura and Boone teaches of acquiring the lock after receiving the command; and releasing the lock after the second I/O process is completed (as the host needs to know what data needs to be locked, the lock must be acquired after the application notifies the OS of the write command. The lock is then removed after the write requests have been carried out, Boone, column 3, lines 58-60).

21. With respect to claim 19, the combination of Kawamura and Boone teaches of means for acquiring the lock after receiving the command; and means for releasing the lock after the second I/O process is completed (in the combination of Kawamura and Boone, this is implemented in the host computer of Kawamura as it is taught in Boone, column 3, lines 37-60).

22. With respect to claims 6, 13, and 20 the combination of Kawamura and Boone teaches of wherein the locks are not backed up during a backup operation (Boone, column 3, lines 36-45; as the locks are used to prohibit access to the data being backed-up and are not stored as a part of that data, they would not be backed up).

23. Claims 7, 14, 21, 23, 27, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura and Reed et al., US patent 6557089.

24. With respect to claims 7, 14, 23, 27 Kawamura fails to explicitly teach of obtaining a snapshot of the first storage volume; and creating the second storage volume based on the snapshot of the first storage volume. However, Reed teaches of obtaining a snapshot of the first storage volume; and creating the second storage volume based on the snapshot of the first storage volume (fig. 4; column 8, lines 51-57).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura and Reed at the time of the invention to backup the contents of the first storage volume to a second storage volume as taught in Reed in Kawamura. Their motivation would have been to backup data where the operation of the source volume remains minimally affected (Reed, Column 3, lines 39-55).

25. With respect to claims 21 and 31, Reed teaches of means for obtaining a snapshot of the first storage volume; and means for creating the second storage volume based on the snapshot of the first storage volume (fig. 1A, 4; column 8, lines 42-57; item 122).

26. Claims 24-25, 28-29, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura, Reed, Boone, and Nakano et al., US patent application publication 2003/0051111.

27. With respect to claims 24 and 28, Kawamura teaches of writing first data associated with the first I/O process to the first storage volume (fig. 1, 5; paragraph 0031)

Boone teaches of acquiring a lock from a lock mechanism; and releasing the lock (fig. 4; column 3, line 35-60; column 8, lines 32-56)

Kawamura fails to explicitly teach of writing first data to a first storage volume; replicating, substantially concurrently, the first data to the second storage volume. However, Nakano teaches of writing first data to a first storage volume; replicating, substantially concurrently, the first data to the second storage volume (fig. 5; paragraphs 0065-0067).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura, Reed, and Boone at the time of the invention to lock the data of the combination of Kawamura and Reed being copied as taught in Boone. Their motivation would have been to solve data access conflicts that could result in an inconsistency in data (Boone, column 3, lines 64-66).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura, Reed, Boone and Nakano at the time of the invention to synchronously replicate the data to the second volume from the first. Their motivation would have

been to keep the two storage locations identical in the event of a failure so the backup is in an identical state of the failed device (Nakano, paragraph 0067).

28. With respect to claim 32, Kawamura teaches of means for writing first data associated with the first I/O process to the first storage volume (fig. 1-3; paragraph 0029, 0031; items 10, 20);

Boone teaches of means for acquiring a lock from a lock mechanism; and means for releasing the lock (fig. 4; column 3, line 35-60; column 8, lines 32-56; host computer)

Nakano teaches of means for replicating, substantially concurrently, the first data to the second storage volume (fig. 1; paragraphs 0078-0080; data copy monitoring function in the controller).

29. With respect to claims 25 and 29, Kawamura teaches of writing second data associated with the second I/O process to the second storage volume without replicating the second data to the first storage volume (fig. 1, 5; paragraph 0032);

Boone teaches of acquiring a lock from a lock mechanism; and releasing the lock (fig. 4; column 3, line 35-60; column 8, lines 32-56)

30. With respect to claim 33, Kawamura teaches of means for writing second data associated with the second I/O process to the second storage volume without replicating the second data to the first storage volume (fig. 1-2, 4; paragraph 0029, 0032; items 10, 30);

means for acquiring the lock from the lock mechanism; and means for releasing the lock (fig. 4; column 3, line 35-60; column 8, lines 32-56; host computer).

31. Claims 26, 30, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura, Reed, Boone, Nakano in view of McDowell US patent 6389459.

32. With respect to claims 26 and 30, Kawamura fails to explicitly teach of deactivating the first storage volume after the first I/O process is completed. However, McDowell teaches of deactivating the first storage volume after the first I/O process is completed (column 5, lines 15-32; where after the secondary system executes the write request, the secondary mirror volumes (first storage volume) are locked to all users. As no access can be granted to the volume, it is deactivated); and

performing a backup operation on the first storage volume (column 4, line 61- column 5, line 2; where the data on the primary volume is mirrored to the secondary volume (first storage volume)).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura, Reed, Boone, Nakano and McDowell at the time of the invention to prohibit all access to the first volume of the combination of Kawamura, Reed, Boone, Nakano after backing up to that drive. Their motivation would have been to ensure that the data is not corrupted as a result of an accidental write to the drive (McDowell, column 5, lines 29-32).

33. With respect to claims 34, McDowell teaches of means for deactivating the first storage volume after the first I/O process is completed (fig. 3, item 307, 308; column 4, line 58- column 5, line 35); and means for performing a backup operation on the first storage volume (fig. 3, item 307, 308; column 4, line 58- column 5, line 35).

34. Claims 1-3, 8-10, 15-17, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura and Gagne et al., US patent 6370626.

35. With respect to claims 1, 8, and 22 Kawamura teaches of the limitations cited above. Gagne teaches of wherein the second I/O process is accessing the same data, in the data processing system, as the first I/O process (abstract).

It would have been obvious to one of ordinary skill in the art having the teachings of Kawamura and Gagne at the time of the invention to enable the two processes to access the same data in Kawamura as taught in Gagne. Their motivation would have been to avoid delays keeping the subsequent processes from accessing the data (Gagne, column 2, lines 9-15).

36. Claims 4-6, 11-13, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura and Gagne as applied to claims 1, 8, 15 above, and further in view of Boone.

37. With respect to claims 4-6, 11-13, 18-20 the combination of Kawamura, Gagne, and Boone teaches of the limitations of the respective claims as taught above with the same reasoning as above.

38. Claims 7, 14, 21, 23, 27, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura and Gagne as applied to claims 1, 8, 15, 3, 10, 17 above, and further in view of Reed.

39. With respect to claims 7, 14, 21, 23, 27, 31 the combination of Kawamura, Gagne, and Reed teaches of the limitations of the respective claims as taught above with the same reasoning as above.

40. Claims 24-25, 28-29, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura, Gagne, and Reed as applied to claims 23, 27, 31 above, and further in view of Boone and Nakano.

41. With respect to claims 24-25, 28-29, 32-33 the combination of Kawamura, Gagne, Reed, Boone and Nakano teaches of the limitations of the respective claims as taught above with the same reasoning as above.

42. Claims 26, 30, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura, Gagne, Reed, Boone, and Nakano as applied to claims 25, 29, 33 above, and further in view of McDowell.

43. With respect to claims 26, 30, 34 the combination of Kawamura, Gagne, Reed, Boone, Nakano, and McDowell teaches of the limitations of the respective claims as taught above with the same reasoning as above.

Response to Arguments

44. Applicant's arguments filed 11/28/2006 have been fully considered but they are not persuasive.

45. With respect to independent claims 1, 8, 15, and 22, the applicant argues that Kawamura fails to teach of the second I/O process executing while the first process is executing. The examiner disagrees. Figure 5, of Kawamura clearly shows that upon receipt of the write requests Wa and Wb, they are carried out. This is also notated in paragraph 0031-0032. As shown in figure 5, the time progression proceeds from the top of the page to the bottom (start to end). As such, step 507, where Wb starts being

written occurs after step 503 where Wa starts being written and ***before*** step 504, where the notification of write completion of Wa occurs. Thus Wa and Wb occur simultaneously.

Additionally, in the abstract and paragraph 0009. Kawamura states, "The host computer transmits data to be written and a write request Wa to the primary storage device in writing of data into the primary storage device and transmits the data to be written and a write request Wb to the secondary storage device ***at any point in time*** after the foregoing transmission." Since it occurs at any point in time afterwards, it must be able to occur immediately afterwards, which would result in both Wa and Wb being carried out at the same time.

46. The applicant also argues, citing paragraph 0033 of Kawamura that the step of data transmission must occur *after* the write request Wb compared to being *with* the write request as the examiner contends (page 9, 2nd full paragraph). The examiner disagrees. Paragraph 0033 shows two possible embodiments of that, one where they are sent together, "Note that...the data to be written is transmitted while being attached to the data write request Wb, to the secondary storage device at the same time as the data write request Wb," and one as the applicant argues.

47. The applicant also argues that, "Gagne is completely silent on 'the second I/O process...executing while the first I/O process is executing.'" The examiner disagrees. In the abstract of Gagne, it is stated, that a common data set is used be multiple data processes. It is abundantly clear to one of ordinary skill in the art that these to processes occur at the same time.

Conclusion

48. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

49. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

50. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

51. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Krofcheck whose telephone number is 571-272-8193. The examiner can normally be reached on Monday - Friday.

52. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

53. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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